

Title: Olefin Production Process
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REMARKS

I. STATUS OF THE CLAIMS

Claims 1-6 and 22-36 are pending in the present application prior to this amendment. Each of the following amendments reflect limitations that have already been considered by the Examiner, therefore no new issues are presented that would require further consideration or prior art searching.

- Claim 1 is amended to remove the limitation that the reactor be a loop reactor; to incorporate the limitation from claim 34 that the catalyst system is a homogenous liquid; and to incorporate the limitations from claims 3 and 6. Claims 3 and 6 are therefore cancelled.
- Claim 22 is amended to incorporate the limitations of claims 24 and 27. Claims 24 and 27 are therefore cancelled.
- Claims 23, 25 and 26 are amended to reflect a correction that they should depend from claim 22 instead of claim 1.
- Claims 29-33 are amended to reflect a correction that they should depend from claim 28 instead of claim 1.
- Claim 35 is amended to incorporate the limitation from claim 34 that the catalyst system is a homogenous liquid, and to incorporate the limitation from claim 1 that the reactor is a loop reactor.
- Claim 36 is cancelled.

II. CLAIM REJECTIONS UNDER 35 U.S.C. §112

A. Homogenous, Liquid Catalyst Limitation

From the Office Action dated May 5, 2005, the claim limitations specifying that the catalyst is a homogenous liquid, as in current claims 1, 2, 4, 5, 34 and 35, were rejected under 35 U.S.C. §112, paragraph 1 as failing to comply with the written description requirement. However, the applicants believe that the Examiner has used an improper standard to form this

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rejection. The present arguments are therefore focused (1) on whether a proper rejection under 35 U.S.C. §112, paragraph 1 has been formed, and (2) on traversing the Examiner's assertion that the catalyst aspect of the trimerization system is not structurally limiting.

The Examiner begins the rejection by correctly citing the standard for the written description requirement under U.S.C. §112, paragraph 1. See Office Action at page 2, numbered paragraph 3. The Examiner then acknowledges the support for this limitation in the specification at page 15, lines 16-17 ("a preferred solvent for a *homogenous* catalyzed trimerization process is cyclohexane."). Additional support for such embodiments is also provided in Examples 1 and 2 of the specification starting at page 16.

From this analysis alone, the applicants believe it is clear that the requirements of §112, paragraph 1 have been met. However, the Examiner then imposes an additional, improper requirement under §112, paragraph 1 that a limitation must be structurally limiting in order to meet the written description requirement:

[The limitation] does not define or indicate how a 'homogenous catalyst system' would impart any structural distinctions to the device." Office Action at page 3, first paragraph.

Applicants submit that there is no basis for asserting such a requirement under §112, paragraph 1. This provision requires only that the specification contain adequate description to convey the claimed invention to one of ordinary skill in the art. The provision contains no mention of a requirement that a limitation be structurally limiting. The applicants can similarly find no mention of such a requirement in the MPEP or the case law. The applicants therefore believe that the written description requirement of §112, paragraph 1 has been satisfied, and it is therefore respectfully requested that this rejection be withdrawn on this basis.

However, even if such a standard is imposed under §112, paragraph 1, the applicants urge that the present limitation is in fact structural, not functional. In claims 1, 2, 4, 5, 34 and 35, the applicants have not merely claimed a reactor and plumbing *suitable* for accommodating a liquid, homogenous catalyst, as would be the case with a means-plus-function style claim under §112, paragraph 6. Instead, the catalyst component has been specified as an integral part of the apparatus, and has been structurally defined as being (1) in liquid form; and (2) homogenous, which are each significant, physically distinguishing characteristics. The physical configuration

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of the catalyst should therefore be taken as a structural component of the system being claimed. The applicants therefore alternatively request that this rejection be withdrawn on this basis.

B. Loop Reactor Limitation

From the Office Action dated October 18, 2004, the claim limitations specifying that the reactor is a loop reactor, as in current claims 22, 23, 25, 26, 28-33 and 35, were rejected under 35 U.S.C. §112 on the basis that the specification fails to support a limitation that the reactor is a loop reactor. The Examiner cited the passage in the specification at page 18, lines 7-8, which indicates that a continuous feed reaction is used, but the Examiner did not find this to be sufficient support, noting that the term "loop" is not used.

As further support, the applicants refer to page 15 of the specification at lines 1-4:

Reaction products, i.e., olefin trimers as disclosed in this specification, can be prepared with the disclosed catalyst systems by solution reaction, slurry reaction, and/or gas phase reaction techniques using conventional equipment and contacting processes.

The applicants submit that anyone of ordinary skill in the art would readily understand such description to include reference to loop reactors, which are an extremely common configuration of such reactors in industry. Both the Court of Appeals for the Federal Circuit and the PTO have rejected any requirement that the specification have an exact or *in haec verba* description of the claimed invention. *Crown Ops. Int'l, Ltd. V. Solutia Inc.*, 289 F.3d 1367, 1376 (Fed.Cir. 2002); *see also*, Guidelines for Examination of Patent Applications Under the 35 U.S.C. 112, ¶ 1 "Written Description" Requirement, 66 Fed. Reg. 1099, 1105 (Jan. 5, 2001). The applicants therefore respectfully request that this rejection be withdrawn, and that the term "loop reactor" be taken according to its plain meaning as more limiting than merely as a "continuous reactor," as the Examiner indicated at the bottom of page 2 in the Office Action dated October 18, 2004.

The applicants therefore request that this rejection be withdrawn.

III. CLAIM REJECTIONS UNDER 35 U.S.C. §102

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A. Loop Reactor Limitation

In previous Office Actions, the Examiner has rejected all of the independent claims under 35 U.S.C. §102 as being anticipated by the Avidan reference, U.S. Patent No. 4,778,661.

Current claims 22, 23, 25, 26, 28-33 and 35 all specify that the reactor of the claimed invention is a loop reactor. Avidan clearly does not disclose loop reactors, and the Examiner has not disputed this. Instead, the Examiner has interpreted "loop reactors" as meaning "continuous reactors," and the Applicants acknowledge that Avidan does refer to a "continuous process" in the passages cited by the Examiner. The applicants therefore submit that once the term "loop reactor" is properly interpreted, then no rejection under §102 can be maintained over the forgoing claims which include this limitation.

The applicants therefore request that this rejection be withdrawn.

B. Catalyst Deactivation Limitation

In the Office Action dated October 18, 2004, the Examiner acknowledged at page 5, line 4, that Avidan does not disclose an inlet for a catalyst system deactivator. Each of current claims 1, 2, 4, 5, 22, 23, 25 and 26 now incorporate this limitation, which was formerly presented in claim 3. Therefore, the applicants submit that no rejection of these claims can be maintained under §102.

The applicants therefore request that this rejection be withdrawn.

C. Liquid, Homogenous Catalyst Limitation

Current claims 1, 2, 4, 5, 34 and 35 are directed to homogenous, liquid catalyst systems. Avidan does not disclose homogenous, liquid catalyst systems, either in its claims or in its general description. Instead, Avidan is directed specifically to a fluidized bed process. See, e.g., Abstract at line 1. In fact, in addition to teaching fluidized bed reactions, Avidan specifically teaches away from liquid phase reactions. See, e.g., col. 7, lines 4-13 ("thus avoiding deleterious liquid phase reactions of the diene components"). Therefore, the applicants submit that no rejection of these claims can be maintained under §102.

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The applicants therefore request that this rejection be withdrawn.

IV. CLAIM REJECTIONS UNDER 35 U.S.C. §103

A. Rejections Under §103 Based On Avidan Combined With Lashier, Mehra

The Examiner has combined Avidan with Lashier (U.S. Patent No. 5,689,028) to conclude that the limitation would be obvious of having an inlet for a catalyst deactivator. See Office Action dated May 5, 2004 at page 6, numbered paragraph 9; Office Action dated October 18, 2004 at page 5, numbered paragraph 3. In each case, this rejection was directed to dependent claims 3 and 24, which in the current claims have been incorporated into independent claims 1 and 22, respectively. The applicants note that the specific language of this limitation is "a catalyst system deactivator inlet line operably connected into said reactor effluent line."

The Examiner has combined Avidan with Mehra (U.S. Patent No. 5,521,264) to conclude that the limitation would be obvious wherein the inlet line from the source of the catalyst system further comprises a reactor inlet operably connected from a source of trimerization reaction solvent. See Office Action dated May 5, 2004 at page 8, numbered paragraph 11; Office Action dated October 18, 2004 at page 6, numbered paragraph 5. In each case, this rejection was directed to dependent claims 6 and 27, which in the current claims have also been incorporated into independent claims 1 and 22, respectively.

Given the fact that the claims to which the above rejections were directed have been combined into claims 1 and 22, any continued rejection of claims 1 and 22 would now therefore have to be based on the combination of all three references: Avidan, Lashier, and Mehra. The applicants submit that no motivation has been cited or otherwise shown under which these references could have been reasonably combined. However, more importantly, the applicants submit that the limitations of current claims 1 and 22 would not be achieved even if this combination were made.

In particular, Mehra does not show the subject matter to which it has been attributed. As an example, former claim 6, against which Mehra was combined with Avidan, contained the following language:

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6. A trimerization system in accordance with Claim 1, wherein said inlet line from the source of catalyst system further comprises a reactor inlet operably connected from a source of trimerization reaction solvent.

This limitation is important in some embodiments because the catalyst flow rate through the reactor can be small enough that pre-dilution with reaction solvent is desirable to control the residence time of the catalyst in the reactor. In each of the rejections citing Mehra, the Examiner points to col. 13, lines 61-65 of Mehra for the proposition that Mehra "teaches the use of a solvent to absorb ethylene, higher alpha olefin comonomers, and heavier hydrocarbons." The applicants submit that this has nothing to do with the limitation in question, that is, the dilution of an inlet catalyst stream. Mehra simply does not discuss this consideration. Furthermore, the applicants note that Mehra is directed to heterogenous catalysts in fluidized bed reactors for gas phase reactions. No one of skill in the art would have turned to these references for the subject matter of claims 1 and 22. And even if these references had been taken together for some reason, the catalyst dilution aspect of claims 1 and 22 would not have been apparent.

The applicants therefore request that the §103 rejections based on combining Avidan with Lashier and Mehra be withdrawn.

B. Rejections Under §103 Based On Avidan Combined With Harandi

The Examiner has combined Avidan with Harandi (U.S. Patent No. 4,788,366) to conclude that the limitation would be obvious of an inlet line operably connected into said reactor effluent line from a source of heavies. See Office Action dated May 5, 2004 at page 7, numbered paragraph 10; Office Action dated October 18, 2004 at page 5, numbered paragraph 4. This rejection was previously directed to dependent claims 5 and 26.

As stated previously, Avidan is directed to a fluidized bed process. Harandi is also directed to a fluidized bed reactor system (col. 6, lines 15-16), and Harandi does not otherwise cure the deficiencies of Avidan. No motivation has been cited or otherwise shown under which these references could have been reasonably combined to arrive at the current claims 5 and 26. And more importantly, since claims 5 and 26 depend from claims 1 and 22, respectively, and since claims 1 and 22 have been amended as discussed above, then it follows that if even if

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Harandi had been combined for some reason with Avidan, and with Lashier and Mehra, the combination of such teachings would still not arrive at all of the limitations of claims 5 and 26, including specifically the catalyst dilution aspect for which Mehra has been cited.

The applicants therefore submit that the §103 rejections based on combining Avidan with Harandi have been rendered moot, and applicants therefore request that such rejections be withdrawn.

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V. CONCLUSION

Since each of the current claims reflect verbatim limitations that have already been considered by the Examiner, it follows that no new issues are presented that would require further consideration or prior art searching. The applicants submit that the amendments and remarks presented herein are sufficient to address all of the prior art concerns previously raised by the Examiner in past Office Actions. The applicants therefore respectfully request that the amendments be entered, and that an advisory Office Action be issued in their regard, allowing all of the presented claims, or otherwise any portion thereof as considered appropriate by the Examiner.

The applicants would welcome any discussion if the Examiner has any questions or continuing concerns. The Examiner is therefore invited to call the undersigned at (832) 813-4661 if this might be helpful.

Respectfully submitted,



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